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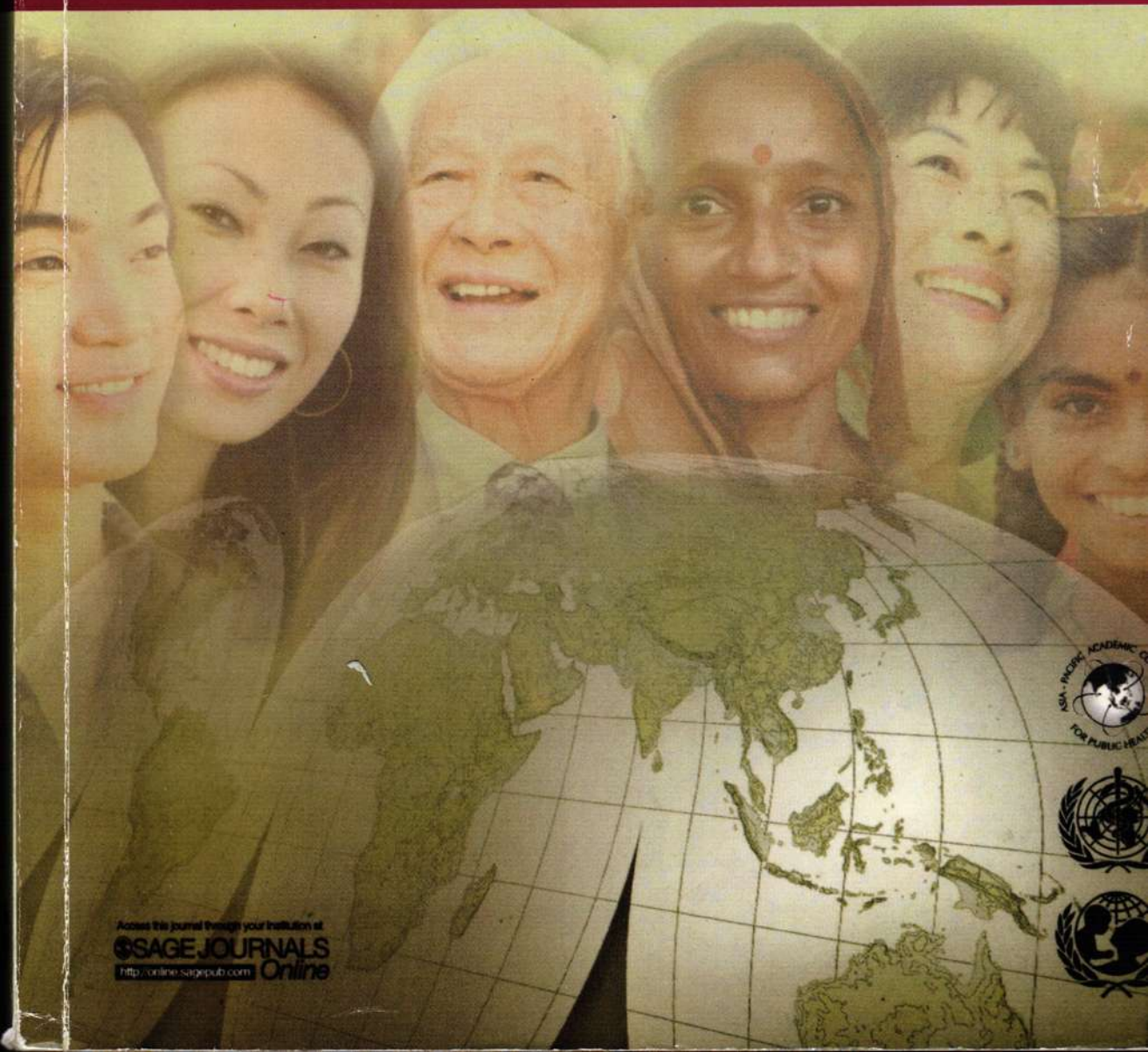

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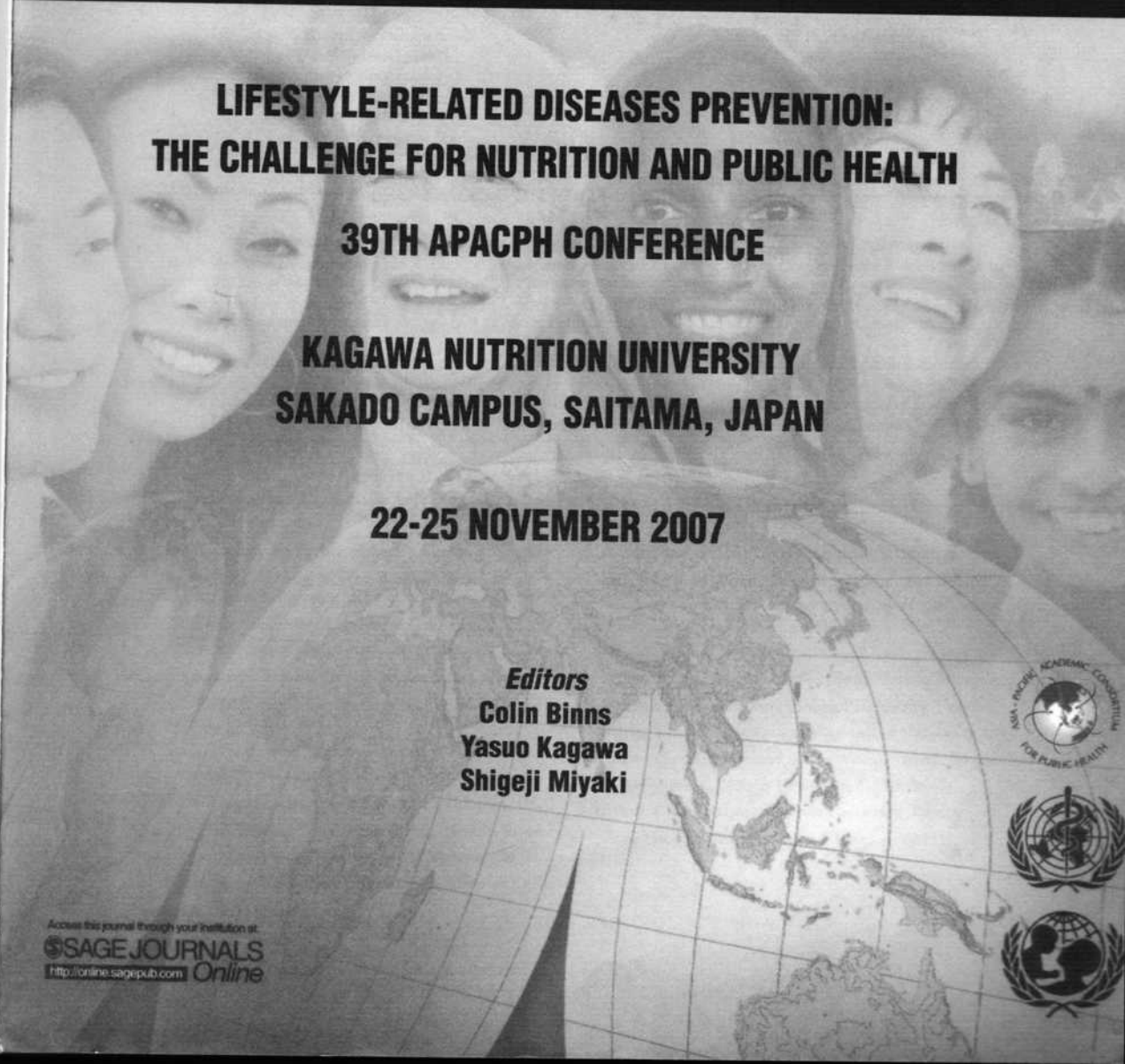

LIFESTYLE-RELATED DISEASES PREVENTION: THE CHALLENGE FOR NUTRITION AND PUBLIC HEALTH

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Housing Sanitation and Acute Respiratory Tract Infection among Undergraduate Students in Indonesia

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Acute respiratory tract infection is a common infectious disease in students living in crowded housing in Indonesia. The aim of this study was to investigate the association between air quality in boarding houses and ARI occurrence in students. A cross sectional study was undertaken on 89 houses occupied by students in Mulyorejo Village, Mulyorejo Subdistrict Surabaya determined by using a systemic random sampling method. Population density, ventilation, temperature and humidity were measured. The study concludes that there is significant association between the population density, ventilation, humidity and ARI occurrence but not temperature. Therefore, student boarding houses should provide good air quality and sanitation to reduce the incidence of acute respiratory tract infection.

Keywords: housing sanitation; air quality; acute respiratory infection; university students; Indonesia

Background

Respiratory tract infections such as influenza, pneumococcal disease and tuberculosis, can easily spread among students because of improper ventilation and living conditions. Living environments can cause health disorders, due to poor ventilation, temperature and humidity.[1,2] Acute Respiratory Tract Infection (ARI) is one of the main health problems in Indonesia with a high incidence rate, particularly in children under 5 years of age. Factors influencing the incidence of ARI in under five children include the physical and sanitation conditions of their house, population density and air pollution inside the house (indoor pollution). ARI is most common in under five year old children, but ARI also occur in adults and teenagers.[3-6] In urban areas, 80% of individual activity is inside a room. Sources of indoor pollution include pollution from outdoors entering the room, cigarette smoke, fumes from kitchens and the use of insect sprays.[6,7] Undergraduate students often live in group housing around Airlangga University, Surabaya. Generally these students come from outside Surabaya who don't have family that live close to the campus. Students choose houses because they are close to campus

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and provide study facilities at an affordable price. Mulyorejo village, close to the university campus is a common location for shared housing. According to annual report in public clinic centre of Airlangga University Surabaya year in 2001 there 1788 cases of ARI in students from Airlangga University. The objective of this study was to investigate the association between housing occupation levels, ventilation, temperature and humidity in student housing in Mulyorejo village and acute respiratory infection (ARI).[2,8]

Methods

A cross sectional study was undertaken in the occupants of 89 out of the 1176 houses in Mulyorejo village. A questionnaire was used to carry data on ARI symptoms, number of occupants per house, personal space, ventilation, temperature and humidity. The data was entered into an Excel database and analysed using Epi Info for windows.[9-10]

Results and Discussions

The houses were classified by the area available per person, more or less than 4 m^2 per person, see Table 1.

Table 1. Association between House Area per Person and ARI in Mulyorejo Village

No	Population House Density	ARI		Health		Amount	%
		n	%	n	%		
1.	Poor	51	76,12	9	40,91	60	67,42
2.	Good	16	23,88	13	59,09	29	32,58
	Total	67	100	22	100	89	100

$P = .005$ $df = 1$

The association between housing ventilation and ARI incidence is shown in Table 2.

Table 2. Association between Housing Ventilation and ARI in Mulyorejo Village

No	Ventilation	ARI		Health		Amount	%
		n	%	n	%		
1.	Poor	56	83,58	7	31,58	63	70,79
2.	Good	11	16,42	15	68,18	26	29,21
	Total	69	100	22	100	89	100

$P = .000$ $df = 1$

The association between housing temperatures and ARI is shown in Table 3.

Table 3. Association between House Temperature and ARI at Mulyorejo Village

No	Temperature	ARI		Health		Amount	%
		n	%	n	%		
1.	Poor	66	98,51	20	90,91	86	96,63
2.	Good	1	1,5	2	9,1	3	3,37
	Total	67	100	22	100	89	100

$P = .302$ $df = 1$

The association between housing humidity and ARI incidence is shown in Table 4.

Table 4. Association between House Humidity and ARI at Mulyorejo Village Mulyorejo Subdistrict Surabaya Village ARI Occurrence

No	Humidity	ARI		Health		Amount	%
		Σ	%	Σ	%		
1.	Poor	49	73,13	10	45,45	59	66,29
2.	Good	18	26,87	12	54,55	30	33,37
	Total	67	100	22	100	89	100

$P = .034$ $df = 1$

These results show the importance of not overcrowding student housing and providing adequate ventilation and air quality to ensure the health of students. Room temperatures inside houses are influenced by outside air temperatures, air circulation and air humidity inside rooms.[11] Air temperatures depend on the ambient weather and humidity is also an important factor in the spread of infection.[7,11]

Air humidity inside rooms increases because of bad ventilation due to evaporation from skin or exhaled air.[11,12] A small area per inhabitant facilities the spread of infection and also increases humidity.[1,3,13]

Conclusion

The results of this study show that the incidence of ARI is related to overcrowding, humidity and room temperatures in student housing in Mulyorejo village.[13] Students require a minimum of 4 m^2/person with adequate ventilation and opening windows.[12,13] Windows should be at least 10% of the room width. The room temperature inside the house should be kept at a comfortable level and the humidity reduced by use of the windows.

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